TO: Doug Howard, Regional Administrator

FROM: Olga Cuzmanov, Associate Engineer

RE: City of Rupert - Wastewater Land Application Permit Application LA-000001-03

DATE: May 30, 2007

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400.04 for issuing staff analyses related to wastewater reuse (WRA) permits. It states the principal facts and significant questions considered in preparing the draft permit conditions or the intent to deny, with a summary of the basis for the draft conditions or denial with references to applicable requirements and supporting materials.

WASTEWATER TREATMENT SYSTEM

The City of Rupert operates a municipal wastewater treatment system serving domestic and industrial users. The current major industrial users are a cheese manufacturing facility (Brewster Cheese, formerly Kraft Inc.) and a potato processing plant (Idaho Foods, formerly Idahoan).

Currently, pretreatment facilities include:

- Headworks with mechanical bar screen and flow measurement;
- Secondary treatment with two aeration basins;
- Effluent transfer pump station and pipeline;
- Three cells facultative lagoon system (total of 233 acres and approximately 450 million gallons);
- Effluent disinfection system; and
- Land application site (currently approved for a total of 629 acres of which 261 acres are used).

The permit renewal application proposes increasing the irrigated management unit MU-00105 (handline area between Cell # 1 and Cell# 3) by adding 34 acres.

Effluent from the facultative lagoons is disinfected with chlorine and land applied on farmland. The current land application system consists of a total 663 acres. However, only 261 acres were used in the past five (5) years: center pivot #1 (Lockwood, 124 acres) and #2 (Zimmatic, 107 acres) and a 30 acre

area irrigated by hand-line sprinklers. An additional 368 acres were conditionally permitted. For the 368 acres, a site characterization is required to determine the surface covered with rock outcrop. The areas with rock outcrop would be excluded from the wastewater reuse.

Due to the industrial users, the influent wastewater strength is much higher than typical domestic-only wastewater. To address this problem, the City is in the process of upgrading the wastewater treatment plant. The improvements will be implemented over three (3) phases and the first phase was started February 2007.

PERMIT HISTORY

The City of Rupert was issued the first Wastewater Land Application permit LA-000001 on March 13, 1989 and expired February 28, 1994. On July 21, 1993, the permit was administratively extended to February 28, 1997 and the following year the Department granted a conditional extension until June 1, 1999.

The City of Rupert submitted an application for renewal of their first permit in June 1997. Additional information was provided after 1997, and the current permit was issued on August 2, 2002 and will expire on August 2, 2007. On April 12, 2007, the Department received a permit renewal application and will issue a new permit on or before the expiration date.

SITE CHARACTERIZATION

1.0 SOILS

The soil characteristics for the site were discussed in the staff analysis dated August 8, 2002 in preparation of the current permit. The City of Rupert proposed in the recently submitted permit renewal application to add 34 acres adjacent to MU-00105 (handlines area between Cell #1 and cell #3) bringing the total acreage of the handlines to 64 acres. The proposed acreage is similar in composition to the existing handlines area: silt loam type soils (Portneuf and Wheeler). The soil permeability varies between 0.6 and 2.0 inches/hour, which is a moderate range, adequate for wastewater land application. The calculated available water holding capacity for the handlines area is 10 inches.

Also, the current permit includes 368 acres which have not been used in the past approximately five years since the permit was issued. The City of Rupert intends to maintain this acreage in the future wastewater reuse permit. However, before wastewater is reused at those sites, the City of Rupert shall determine the percent of non-cultivated or rock outcrop area. No application credit should be allowed for land applying on rock outcrop.

1.1 SOILS CHEMISTRY

The Phosphorus levels in the first foot at the farms irrigated with wastewater are shown below

		2003		2004		2005		2006	
		April	October	April	October	April	October	April	October
MU-01 (Lockwood)	ppm	19	46	27	19	16	15	26	27
	lb/ac	**76**	**184**	**108**	**76**	**64**	**60**	**104**	**108**
MU-02 (Zimmatic)	ppm	17	23	24	24	19	18	27	27
	lb/ac	**68**	**92**	**96**	**96**	**76**	**72**	**108**	**108**
MU-05 (Handlines)	ppm	23	23	23	16	19	15	18	24
	lb/ac	**92**	**92**	**92**	**64**	**76**	**60**	**72**	**96**

It appears that the P concentrations are in the medium (18-26 ppm) and high (26-40 ppm) classification according to the Agronomic Training Manual (1998), by Dr. Dale Stukenholtz. This may be caused by the P loading from the wastewater in excess of the crop uptake.

Staff recommends: The P loading from wastewater reuse and fertilizer shall be limited to 150% of the crop uptake. Soil sampling shall continue to be performed in the spring and fall to monitor Nitrogen and Phosphorous values. The permittee shall monitor the Nitrate and Phosphorous in the groundwater.

The Nitrate levels in the first foot at the farms irrigated with wastewater are shown below

		2003		2004		2005		2006	
		April	October	April	October	April	October	April	October
MU-01 (Lockwood)	ppm	10	13	11	14	15	6	6	5
	lb/ac	**40**	**52**	**44**	**56**	**60**	**24**	**24**	**20**
MU-02 (Zimmatic)	ppm	6	9	28	8	7	8	8	4
	lb/ac	**24**	**36**	**112**	**32**	**28**	**32**	**32**	**16**
MU-05 (Handlines)	ppm	16	4	22	8	8	3	8	3
	lb/ac	**64**	**16**	**88**	**32**	**32**	**12**	**32**	**12**

It appears that N concentrations are in the low (less than 10 ppm) and moderate (10 to 30 ppm) classification. This is an improvement from the high (26 ppm for Zimmatic pivot) and very high (41 and 42 ppm for the Handlines and Lockwood pivot, respectively) levels measured approximately ten (10) years ago in 1997.

For the new proposed area (30 acres adjacent to the existing handlines), soil tests were taken and analyzed during October 2006 sampling event. The available nitrogen and phosphorus in the upper one-foot are low: 3 ppm (12 lbs/acre) and 11 ppm (44 lbs/acre), respectively.

Staff Recommends: Maintain the N loading limit from wastewater reuse and fertilizer at 150% of crop uptake. Include the 30 acres adjacent to the handlines in the permitted acreage.

2.0 WASTEWATER QUALITY

The wastewater quality appears to remain the same and it will improve when the treatment plant upgrades will be finished.

An Odor Management Plan required by the Compliance Activity CA-001-05 of the current permit was approved by DEQ on June 12, 2003 and amended on October 17, 2005. The construction of the improvements outlined in the Odor Management Plan and detailed in the Facilities Plan was started in

February 2007. The City should continue to provide schedule updates of the status of the proposed wastewater facilities improvements.

3.0 WASTEWATER LOADING RATES

The growing season for this land application is defined as the period from April 1 to October 31 (214 days). The non-growing season for this land application is defined as the period between November 1 and March 31 (151 days). The hydraulic maximum loading rates were calculated using these time periods. Please see the staff analysis dated August 8, 2002 for details. However, the non-growing season wastewater reuse will be allowed only on an emergency basis after receiving written approval from the Department. Land application will not be allowed during freezing temperatures or during periods when the ground is frozen. Close monitoring of the hydraulic management units will be required to avoid hydraulic overloading, ponding, or runoff.

Staff Recommends: 1) Limit the yearly hydraulic rate of wastewater to Irrigation Water Requirement (IWR) for the specific crop. The proposed future hydraulic rate may change (be diminished), after the determination of the rock outcrop, throughout the 368 acres of conditionally approved sites.

The wastewater loading rates for the past approximately five (5) years are in general close to those anticipated during the preparation of the current permit. The wastewater loadings were compared to the grown crops uptake rates.

- The N loading limit of 150% of crop N removed appears to be well above the N loading from wastewater and fertilizer, with exception of year 2004 when the N loading limit was exceeded on MU-00105 (30 acres handline site).
- In regard to the P loading the current permit did not established a limit for the loading from the wastewater and fertilizer. Based on the information provided with the annual reports for the past four (4) years it appears that the majority of P loadings from wastewater and fertilizer were well above 150% of crop P removed.
- The TDIS loading from wastewater appears to be on average approximately ten (10) times higher compared to the calculated crop ash removed.
- The COD loading from wastewater were well below the 50 lbs/ac-season loading limit.

Staff Recommends: The P loading from wastewater and fertilizer shall be limited in the renewed permit to 150% of the crop uptake and the soil will continue to be monitored to ensure that P does not accumulate and migrate through the soil profile into the ground waters. Also, P will be required to be monitored in the ground water/domestic monitoring wells.

GROUND WATER

Ground water in the vicinity of the Rupert wastewater land application site occurs in a perched and a regional aquifer. The regional ground water system is located approximately 220 feet below ground surface, while the perched aquifer is approximately 115 feet below ground surface. In response to the compliance activity CA-001-02 of the current permit, the flow direction of perched aquifer was determined to be to northwest. The determination is based on monitoring performed by Forsgren Associates and Idaho Department of Water Resources (IDWR) during the summer of 2003.

The ground water is currently monitored in five domestic wells: three (3) upgradient and two (2) downgradient (see table below). It appears that the data obtained during year 2006 is showing TDS concentrations above the Ground Water Quality Standard (500 ppm) in some of the wells sampled: 530 ppm (GW-000102), 560 ppm (GW-000101) and 520 ppm (GW-000105). However, the concentrations appeared to trend down and below 500 ppm in the subsequent samples. The City of Rupert needs to continue to closely review the TDS data to determine if the levels measured in downgradient wells increase significantly over upgradient wells. The City shall then assess whether the increases are caused by wastewater reuse loadings.

Ground Water Monitoring Wells

Monitoring Serial Number	Location	Owner Name	Position
GW-000101	600 North, 150 East	Leonard Larsen (former Bill Cosgrove)	Downgradient
GW-000102	560 North, 275 East	Paul Crane	Upgradient
GW-000103	400 North, 300 East	Richard Strickler (former Wint Maxey)	Upgradient
GW-000104	380 North, 100 East	Sam Sanderson	Upgradient
GW-000105	500 North Meridian	Bruce Bagnall (former Sam Yost)	Downgradient

Staff recommends: The permittee shall continue monitoring on quarterly basis (January, April, July and October) the domestic wells. Also, the renewed permit will require that P be measured in the domestic wells.

BUFFER ZONES AND WELLHEAD PROTECTION

The current permit outlines buffer zone requirements for the site, for sprinkler system. The City of Rupert is maintaining the appropriate buffer zone distances for the level of disinfection of the wastewater effluent.

During the October 2006 domestic wells sampling event fecal coliform was detected in three samples (GW-000102, GW-000103 and GW-000104). It appears that the contamination may have been caused by lack of disinfection after deepening of one of the wells and by surface contamination of the taps used when samples were collected. Additional samples were taken from the contaminated wells and the fecal coliform levels were less than one (1) for all samples.

Staff recommends: Wastewater shall continue to be monitored for total coliform before commencing the irrigation to the reuse sites and the buffer zones must be maintained based on the level of disinfection. Domestic wells shall continue to be monitored for fecal coliform and ensure that contamination is not caused by wastewater reuse activities.

LAGOON COMPLEX

The facultative lagoons were seepage tested as required in the current permit compliance activity CA-001-06. In the letter dated June 17, 2005 it was determined that the recommended seepage rate limit was met for all lagoons. However, it will be required that all storage structures at the treatment facility and land application site be seepage tested during the life of the renewed permit.

SURFACE WATER AND FLOOD ZONES

The closest surface water to the wastewater land application site is East Main Drain located one half (1/2) mile north of Section 33. The area lies outside of the 100 years flood plain as established by the Federal Emergency Management Agency (FEMA).

GRAZING

The current permit does not allow grazing at the wastewater reuse sites. The new renewed permit will require that a Grazing Management Plan be submitted to DEQ for review and approval prior to any grazing activities.

RECOMMENDATION

Staff recommends that a renewed wastewater reuse permit be issued for City of Rupert.

OC:gl
Enclosure: Site maps

cc: Richard Huddleston, Water Quality, IDEQ-SO
Dave Anderson, Regional Manager-Engineering, DEQ-TFRO
WLAP File: LA-000001-03 (SO&TFRO)